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**Title :** Acoustic Localization of Bowhead Whales Near A Beaufort Sea Oil Development, 2001-2002: Evidence Of Deflection at High-Noise Times?

**Category :** Conservation

**Student :** Not Applicable

**Preferred Format :** Oral Presentation

**Abstract :** Bowhead whales, *Balaena mysticetus*, migrate west parallel to the north coast of Alaska during fall, and the nearshore edge of their migration corridor is close to BP's Northstar oil production facility, built on an artificial island. Our objective was to determine the extent to which underwater sound propagating seaward from Northstar during construction (2001) and initial operations (2002) deflected the closest whales farther offshore. The dependent variable was the 5th percentile distance-from-shore, as we expected no effect on whales in the middle of the migration corridor. Power analysis indicated that acoustic localization, unlike aerial surveys, could detect sufficient bowheads to characterize the predicted small-scale deflection. Eleven seafloor acoustic recorders, incorporating DIFAR sensors, provided bearings to calling whales. Locations were estimated from the intersections of bearings. Calling whales were localized for 36 days in 2001 and 23 days in 2002. Totals of 1121 and 2057 calls (respectively) were localized within a 20x26 km area seaward of Northstar where consistent data were obtained. Quantile regression was used to relate the 5th quantile distance from shore and underwater sound as measured continuously ~400 m from Northstar. A permutation method allowed for lack of independence of calls spaced closely in time. In both years, the closest bowhead calls were slightly farther offshore at the noisiest times, with  $\geq 95\%$  confidence (one-sided). The maximum displacement effect was evident if industrial sound was averaged over ~70 min. When the industrial sound was strongest (mainly due to vessels operating near Northstar), the 5th quantile of offshore distances was displaced offshore by ~2.3-3.3 km in 2001, and ~2.2-4.7 km in 2002. However, sound usually was not strong enough to cause displacement, and  $< 1\%$  of the bowheads were displaced by 2+ km. Fieldwork in 2003 should better define the proportions of bowheads displaced various distances. [Supported by BP Alaska.]